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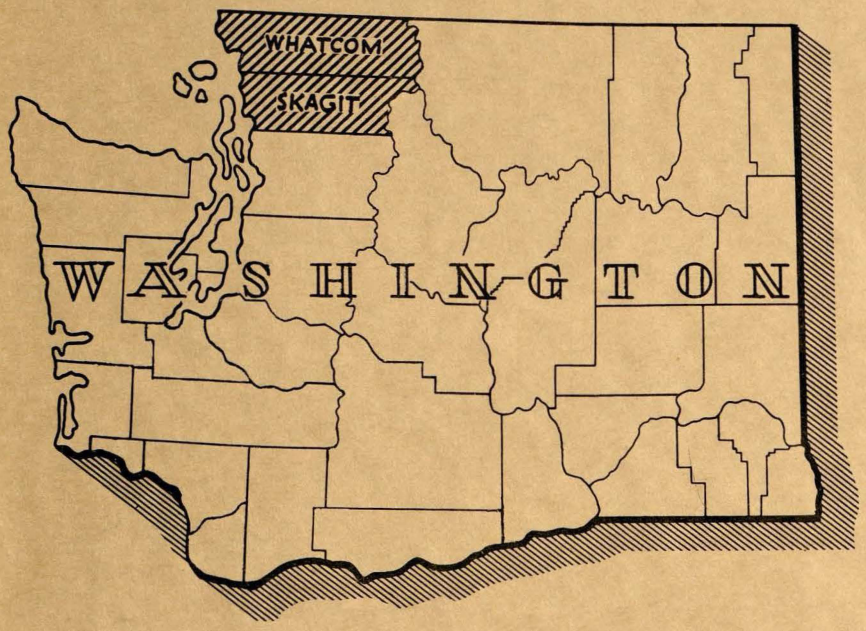
FOREST SURVEY REPORT NO. 133

SEPTEMBER 1959

FOREST STATISTICS *for* SKAGIT *and* WHATCOM COUNTIES, WASHINGTON



PACIFIC NORTHWEST
FOREST AND RANGE EXPERIMENT STATION
U. S. DEPT. OF AGRICULTURE • FOREST SERVICE

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Forest Survey Report 133

FOREST STATISTICS

FOR

SKAGIT AND WHATCOM COUNTIES, WASHINGTON

by

Colin D. MacLean
and
Paul E. Hightree

September 1959

PACIFIC NORTHWEST
FOREST AND RANGE EXPERIMENT STATION
R. W. Cowlin, Director Portland, Oregon

FOREST SERVICE U.S. DEPARTMENT OF AGRICULTURE

PREFACE

This publication summarizes the results of a 1957 reinventory of the forests of Whatcom and Skagit Counties, Wash. The reinventory is a part of the maintenance phase of the Forest Survey, a nationwide project of the Forest Service authorized by the McSweeney-McNary Forest Research Act of 1928, amended June 25, 1949. The purpose of the Forest Survey is to periodically inventory the extent and condition of forest lands and the timber and other products on them to ascertain rates of forest growth and depletion, to estimate present consumption of timber products and determine probable future trends in timber requirements, to analyze and make available survey information needed in the formulation of forest policies and programs, and to make resurveys as necessary to keep the basic information up to date.

The Forest Survey is conducted in the various forest regions of the Nation by the regional experiment stations of the Forest Service. In the Pacific Northwest region of Oregon and Washington, it is an activity of the Pacific Northwest Forest and Range Experiment Station at Portland, Oreg.

The initial inventory of forest lands in Whatcom and Skagit Counties took place in 1931 and 1932. In 1933 the inventory data were adjusted to current conditions, and the next year the Station released forest type maps of both counties (1-inch-to-the-mile scale) and separate statistical reports, "Forest Statistics for Whatcom County, Washington" and "Forest Statistics for Skagit County, Washington." In 1941 the first reinventory of each county's forests was completed, and revised statistical reports and forest type maps were released the following year.

Following the second reinventory in 1957, the forest type maps have again been revised and are available on scales of 1 and 2 inches to the mile.[1/]

1/ A single 1-inch-scale map was prepared for each county; the 2-inch-scale maps were prepared in sections (see index map, inside rear cover). Any of these maps may be obtained at cost of blueprinting. For information write Director, Pacific Northwest Forest and Range Experiment Station, P. O. Box 4059, Portland 8, Oreg.

CONTENTS

Page

Preface

Map: Forest Stand-Size and Condition Classes, Skagit and Whatcom Counties, Wash., 1957

DESCRIPTION OF THE COUNTIES. 1

SIGNIFICANT FINDINGS IN THE FOREST INVENTORY . . 2
- Land Classification 2
- Commercial Forest Land Area 2
  - Major Types 2
  - Stand-Size Classes 3
  - Stocking of Young-Growth Stands 4
- Commercial Forest Land Timber Volumes 4
  - Volume of Sawtimber by Species 4
  - Volume of Sawtimber by Diameter Classes 5
  - Volume of Growing Stock by Species 5
- Forest Ownership 6
  - Commercial Forest Land 6
  - Sawtimber Volume 7
- Log Production 7

SUMMARY TABLES 8

FOREST SURVEY PROCEDURE 34
- Initial Inventory 34
- First Reinventory 35
- Second Reinventory 35

ACCURACY OF 1957 REINVENTORY DATA 36
- Forest Area 36
- Timber Volume 37

DIFFERENCES IN RESULTS OF INVENTORIES 37
- Forest Area 37
- Timber Volume 39

Page

DEFINITION OF TERMS 41
Land Area 41
Forest Land Classes 41
Types 42
Tree Classes 43
Stand-Size Classes 44
Stocking 45
Timber Volume 46
Timber Cut 46

TREE SPECIES 47

List of Tables

1. Land area in Skagit County, by major class of land, 1957 8
2. Land area in Whatcom County, by major class of land, 1957 9
3. Area of commercial forest land in Skagit County, by ownership and stand-size classes, 1957 10
4. Area of commercial forest land in Whatcom County, by ownership and stand-size classes, 1957 11
5. Area of commercial forest land in Skagit County, by major forest type and stand-size class, 1957 . . 12
6. Area of commercial forest land in Whatcom County, by major forest type and stand-size class, 1957 . . 13
7. Land area in Skagit County, by cover type, ownership class, and land-use class, 1957 14-15
8. Land area in Whatcom County, by cover type, ownership class, and land-use class, 1957 16-17
9. Area of commercial forest land in Skagit County, by forest-condition and ownership classes, 1957. . 18
10. Area of commercial forest land in Whatcom County, by forest-condition and ownership classes, 1957. . 19
11. Area of young-growth timber stands on commercial forest land in Skagit County, by stand-size class, species group, and stocking class, 1957 20
12. Area of young-growth timber stands on commercial forest land in Whatcom County, by stand-size class, species group, and stocking class, 1957 . . 21

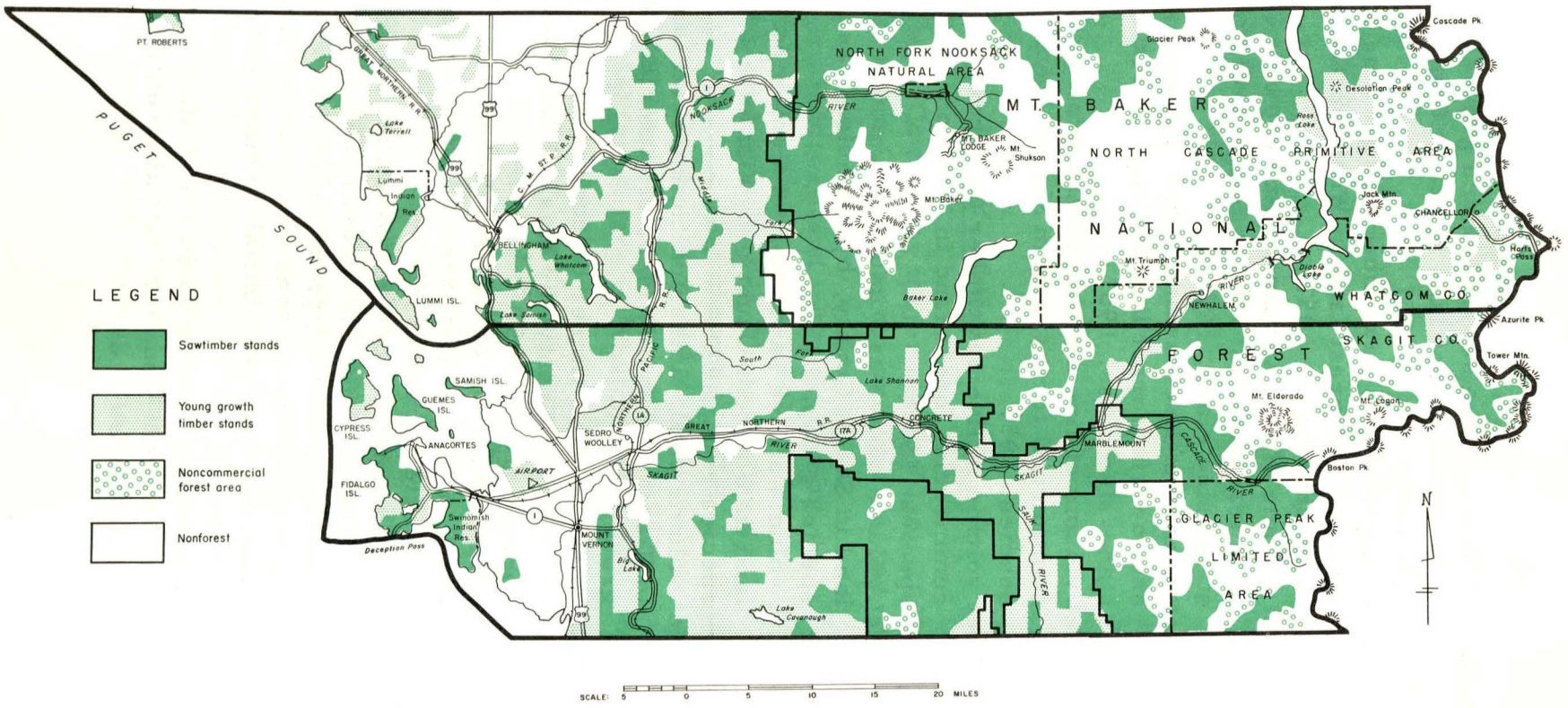
Page

13. Net volume of live sawtimber and growing stock on commercial forest land in Skagit County, by ownership class, 1957 22
14. Net volume of live sawtimber and growing stock on commercial forest land in Whatcom County, by ownership class, 1957 23
15. Net volume of live sawtimber and growing stock on commercial forest land in Skagit County, by stand-size class, 1957 24
16. Net volume of live sawtimber and growing stock on commercial forest land in Whatcom County, by stand-size class, 1957 25
17. Net volume of live sawtimber and growing stock on commercial forest land in Skagit County, by species, 1957 26
18. Net volume of live sawtimber and growing stock on commercial forest land in Whatcom County, by species, 1957 27
19. Net volume of live sawtimber on commercial forest land in Skagit County, by diameter class and species group, 1957 28
20. Net volume of live sawtimber on commercial forest land in Whatcom County, by diameter class and species group, 1957 29
21. Net volume of all timber on commercial forest land in Skagit County, by class of material and species group, 1957 30
22. Net volume of all timber on commercial forest land in Whatcom County, by class of material and species group, 1957 31
23. Average annual cut of live sawtimber and growing stock on commercial forest land in Skagit County, by species group, 1953-57 32
24. Average annual cut of live sawtimber and growing stock on commercial forest land in Whatcom County, by species group, 1953-57. 33
25. Comparison of forest area statistics for Skagit and Whatcom Counties, initial inventory and reinventories 38
26. Comparison of timber volume statistics for Skagit and Whatcom Counties, initial inventory and reinventories 40

FOREST STAND-SIZE AND CONDITION CLASSES

SKAGIT AND WHATCOM COUNTIES, WASHINGTON

1957



DESCRIPTION OF THE COUNTIES

Skagit and Whatcom Counties are situated in northwestern Washington. Whatcom County forms a 24-mile-deep strip bounded on the north by Canada and extending from Puget Sound 95 miles eastward to the crest of the Cascade Range. Skagit County, lying immediately to the south, is of similar size.

The two-county area is drained by the Skagit and Nooksack Rivers and their tributaries. The Skagit River has been impounded by Diablo and Ross Dams, the latter forming a lake extending 20 miles north and into Canada.

The topography of Skagit and Whatcom Counties is extremely varied. The eastern half of the area is a region of glaciers and precipitous, granite mountains. This rugged area ranges in elevation from about 750 feet in valley areas to 10,750 feet at the summit of Mount Baker. Southwestern Whatcom and west-central Skagit Counties are more moderate in topography, with less rugged terrain and elevations up to 4,000 feet. Northwestern Whatcom County and coastal Skagit County are flat agricultural lands. Several large islands in Puget Sound, with a combined area of about 46,000 acres, are included in the two-county area.

The climate varies with elevation and the closeness of Puget Sound. Annual rainfall ranges from 24 inches at Anacortes to more than 100 inches in the higher Cascades. Snowfall is infrequent in coastal areas but common in the interior, with winter snow depths frequently exceeding 30 feet at higher elevations.

Federal Highways 99 and 99A, together with State and county roads, provide easy access to settled parts of western Skagit and Whatcom Counties, and State highways extend eastward as far as Mount Baker Lodge and Newhalem. The Great Northern and Northern Pacific Railroads service coastal areas and the Skagit Valley. Most of the eastern part of the two-county area is roadless, with a forest road over Harts Pass to the old mining townsite of Chancellor providing the only access from the east.

The population of Whatcom County was estimated at 66,733 in 1950, with 51 percent living in Bellingham. Skagit County had an estimated 43,273 persons, with 36 percent living in its three largest cities--Anacortes, Mount Vernon, and Sedro Woolley.

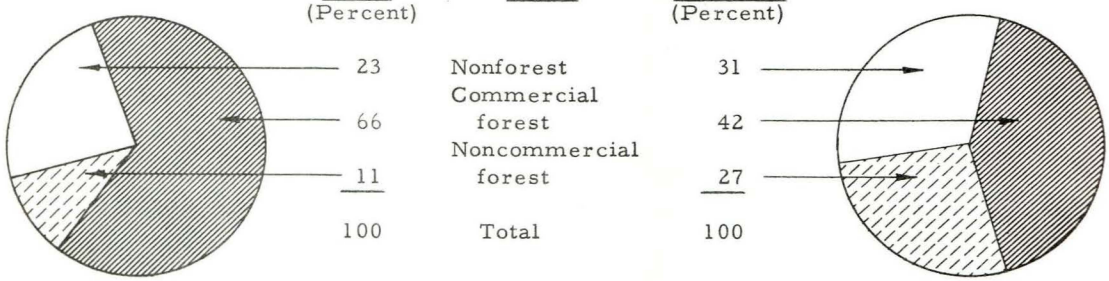
SIGNIFICANT FINDINGS IN THE FOREST INVENTORY

Land Classification

Almost three-quarters of the combined area of Skagit and Whatcom Counties is forest land.

Two-thirds of the nonforest land in Skagit County and almost one-half of that in Whatcom County is farmland. Urban areas and extensive barrens above timberline account for most of the remaining nonforest land.

About 11 percent of the land area of Skagit County is noncommercial forest land. Eighty percent of this is unproductive, consisting of subalpine and noncommercial-rocky areas. The remainder is classified as productive-reserved land--commercial forest land reserved from cutting. In Skagit County, all the productive-reserved land has been set aside for recreational purposes, most of it within the Glacier Peak Limited Area.

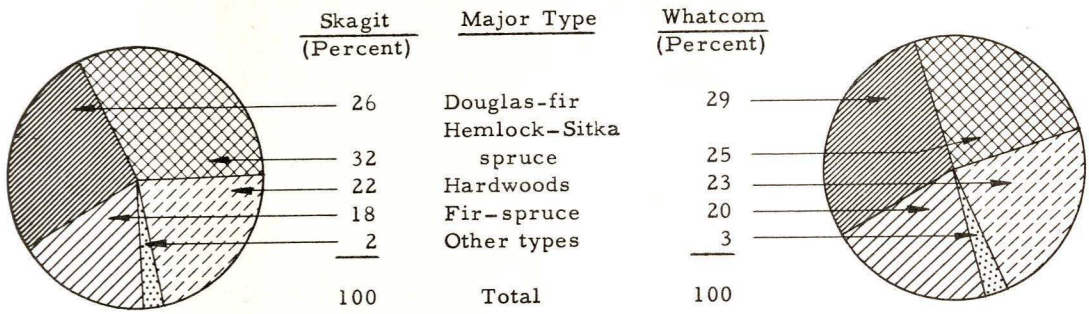


Twenty-seven percent of the land area of Whatcom County is noncommercial forest land. Sixty-five percent of this area is unproductive; the remainder is productive-reserved land, most of which falls within the North Cascade Primitive Area. In addition, the North Fork Nooksack Natural Area has been set aside for permanent preservation in an unmodified condition for purposes of scientific study and education.

Commercial Forest Land Area

Major Types

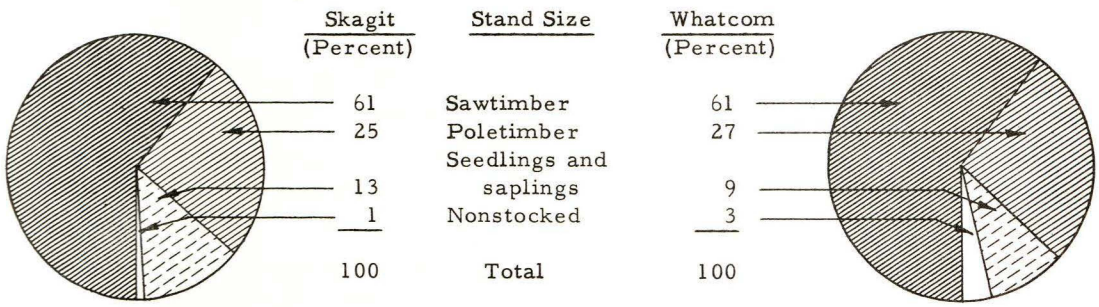
The forests of Skagit and Whatcom Counties are primarily composed of four major types: Douglas-fir, hemlock–Sitka spruce, hardwoods, and fir–spruce.



Douglas-fir stands occur at the lower elevations throughout both counties, but are replaced by hemlock and true firs as elevation increases. Hardwood stands, with red alder predominating, also are present at lower elevations. Many of these stands were established after the original softwood stand was logged. One or more softwood species are frequently a component of hardwood stands, and limited areas of lodgepole pine and western white pine are occasionally found in the two counties.

Stand-Size Classes

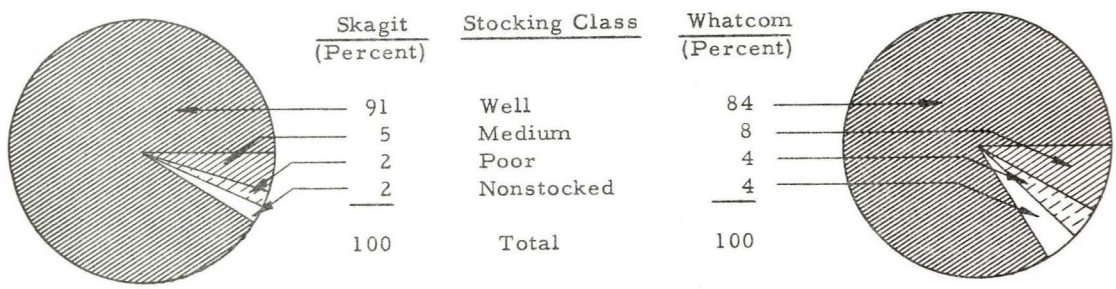
Sawtimber stands occupy slightly more than 60 percent of the commercial forest land of both counties, and stands of large sawtimber (21.0 inches d.b.h. and larger) make up more than half of this. Because past cutting has been concentrated on the more accessible Douglas-fir areas, only one-fifth of the large-sawtimber acreage is in the Douglas-fir areas; the remaining four-fifths is in the higher elevation hemlock and true fir areas. Almost half of the small-sawtimber acreage is Douglas-fir and the other half is about equally divided between hardwoods and hemlock and true firs.



Poletimber stands occupy about one-fourth of the commercial forest land in both counties, whereas seedling and sapling stands comprise approximately one-tenth. About 2 percent of the total area is nonstocked, mostly in recently clear-cut areas.

Stocking of Young-Growth Stands

Most of the young-growth stands are satisfactorily stocked (40-100 percent stocked). Nearly all of those that are poorly stocked are either seedling and sapling or poletimber stands.



Skagit (Percent)	Stocking Class	Whatcom (Percent)
91	Well	84
5	Medium	8
2	Poor	4
2	Nonstocked	4
100	Total	100

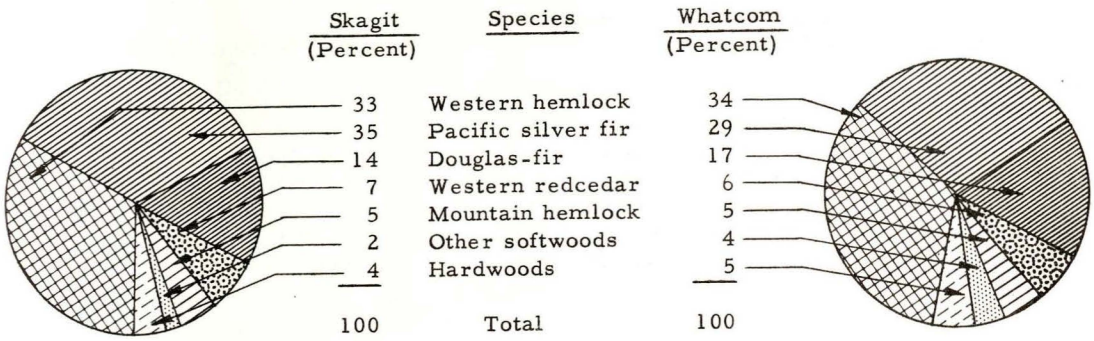
These poorly stocked stands and the nonstocked area comprise 4 percent of the total commercial forest land in the two counties.

Commercial Forest Land Timber Volumes

The net volume of live, sound sawtimber trees (11.0 inches d.b.h. and larger) on commercial forest land in Skagit and Whatcom Counties is estimated to be 26,305 million board feet, Scribner rule. Nearly all this volume is in sawtimber stands, with only 3 percent in sawtimber-size trees in poletimber and seedling and sapling stands and nonstocked areas.

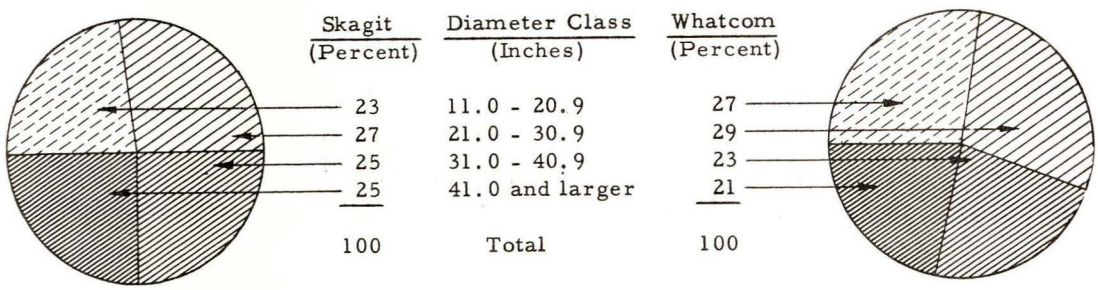
Volume of Sawtimber by Species

More than 95 percent of the live sawtimber volume in the two counties is in softwoods. Western hemlock and Pacific silver fir together account for about two-thirds of the total sawtimber volume. An additional one-fifth is in Douglas-fir and western redcedar. The remaining volume is distributed mainly among the following species: mountain hemlock, red alder, bigleaf maple, Engelmann spruce, Sitka spruce, black cottonwood, white fir, subalpine fir, Alaska-cedar, western white pine, lodgepole pine, and western paper birch.



Volume of Sawtimber by Diameter Classes

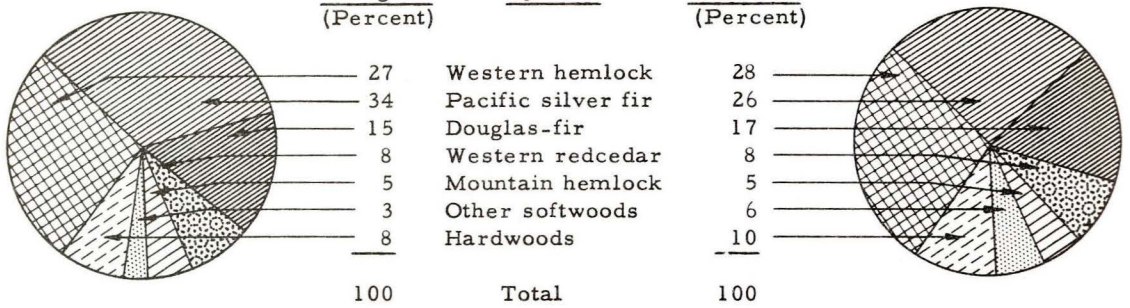
The distribution of volumes by diameter classes is relatively uniform, with approximately one-quarter of the volume in each class.



Among all the species, western redcedar has the greatest proportion of its volume in trees 41 inches and larger, amounting to 46 percent of the total redcedar volume. Douglas-fir and western hemlock have 31 to 33 percent of their volume in this same diameter class.

Volume of Growing Stock by Species

Growing-stock volume includes all live, sound trees 5.0 inches d.b.h. and larger to a minimum 4-inch top inside bark. Three species--western hemlock, Pacific silver fir, and Douglas-fir--comprise about three-fourths of the growing stock in both counties.



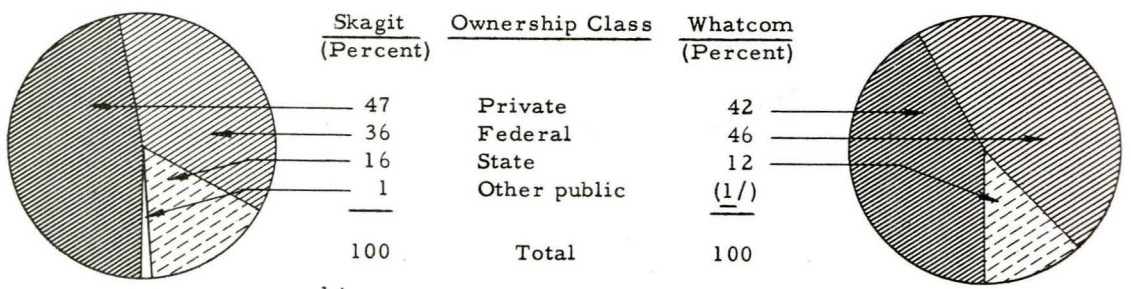
Skagit (Percent)	Species	Whatcom (Percent)
27	Western hemlock	28
34	Pacific silver fir	26
15	Douglas-fir	17
8	Western redcedar	8
5	Mountain hemlock	5
3	Other softwoods	6
8	Hardwoods	10
100	Total	100

Of the total growing stock in the two counties, 86 percent is in sawtimber trees and 14 percent in poletimber trees.

Forest Ownership

Commercial Forest Land

Almost 45 percent of the commercial forest land of both counties is in private ownership, 14 percent is State owned, and less than 1 percent is divided between county and municipal holdings. The remainder, amounting to about 40 percent of the total commercial forest land, is federally owned or administered.



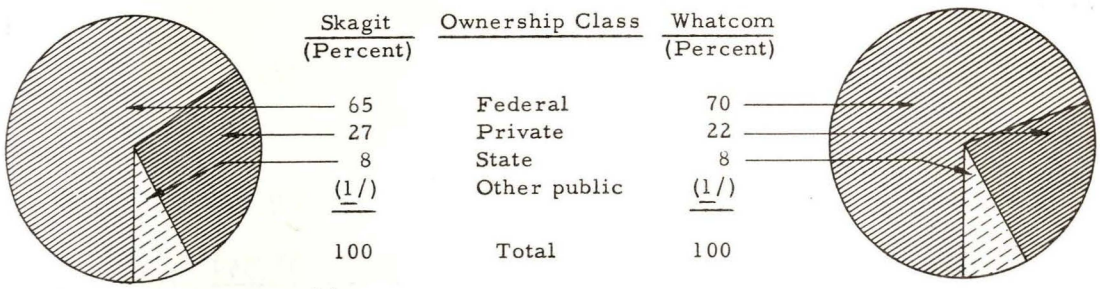
Skagit (Percent)	Ownership Class	Whatcom (Percent)
47	Private	42
36	Federal	46
16	State	12
1	Other public	(1/)
100	Total	100

1/ Less than 0.5 percent.

All but 4 percent of the Federal area is in the Mount Baker National Forest; the other Federal lands are administered by the Bureau of Indian Affairs and the Bureau of Land Management.

Sawtimber Volume

Approximately two thirds of the total sawtimber volume is federally owned. Most of the remaining sawtimber volume is on private and State lands, with only one-fourth of 1 percent on county and municipal lands.



Skagit (Percent)	Ownership Class	Whatcom (Percent)
65	Federal	70
27	Private	22
8	State	8
(1/)	Other public	(1/)
100	Total	100

1/ Less than 0.5 percent.

Log Production

In 1957 total log production in Skagit and Whatcom Counties was 270 million board feet, Scribner rule. During the past 10 years, log output has averaged 325 million board feet annually, ranging from 265 million in 1954 to 433 million in 1950.

As the supply of mature private timber has dwindled, the stepped-up national-forest timber harvest has become increasingly important to the local economy. The national forest's share of the two counties' log production rose from 23 percent in 1949 to 52 percent in 1957.

Table 1.--Land area in Skagit County, by major class of land, 1957

Class of land	Area
	Acres
Forest:	
Commercial	724,277
Noncommercial:	
Productive-reserved	23,350
Unproductive	100,559
Total forest	848,186
Nonforest	259,964
All classes	1,108,150

Table 2.--Land area in Whatcom County, by major class of land, 1957

Class of land	Area
	Acres
Forest:	
Commercial	574,872
Noncommercial:	
Productive-reserved	128,570
Unproductive	237,919
Total forest	941,361
Nonforest	428,819
All classes	1,370,180

Table 3.--Area of commercial forest land in Skagit County, by ownership and stand-size classes, 1957

(In acres)

Ownership class	Total	Sawtimber stands	Poletimber stands	Seedling and sapling stands	Nonstocked areas
Private	339,550	160,900	109,400	65,570	3,680
State	116,300	42,450	53,700	15,690	4,460
County	3,540	720	2,430	390	--
Municipal	2,970	1,850	1,010	110	--
Federally owned or administered:					
Indian	6,120	3,930	1,910	240	40
Bur. of Land Mgt.	3,640	3,300	260	70	10
National forest	252,157	227,292	15,268	8,074	1,523
Total Federal	261,917	234,522	17,438	8,384	1,573
All ownerships	724,277	440,442	183,978	90,144	9,713

Table 4.--Area of commercial forest land in Whatcom County, by ownership and stand-size classes, 1957

(In acres)

Ownership class	Total	Sawtimber stands	Poletimber stands	Seedling and sapling stands	Nonstocked areas
Private	238,880	93,970	101,840	33,800	9,270
State	69,390	32,300	25,580	9,580	1,930
County	1,170	260	440	360	110
Municipal	1,390	520	710	160	--
Federally owned or administered:					
Indian	8,660	5,700	2,820	140	--
Bur. of Land Mgt.	4,080	1,700	1,920	310	150
National forest	251,302	216,547	23,556	8,099	3,100
Total Federal	264,042	223,947	28,296	8,549	3,250
All ownerships	574,872	350,997	156,866	52,449	14,560

Table 5.--Area of commercial forest land in Skagit County, by major forest type and stand-size class, 1957

(In acres)

Forest type	Total	Sawtimber stands		Poletimber stands	Seedling and sapling stands	Nonstocked areas
		Large[1/]	Small[2/]			
Douglas-fir	190,395	47,201	77,320	52,954	12,920	--
Hemlock—Sitka spruce	229,126	130,671	32,015	26,150	40,290	--
Ponderosa pine	40	--	--	--	40	--
Western white pine	1,347	--	--	1,347	--	--
Lodgepole pine	2,844	--	--	2,764	80	--
Fir—spruce	127,505	85,303	17,185	6,323	18,694	--
Hardwoods	163,307	1,410	49,337	94,440	18,120	--
Nonstocked	9,713	--	--	--	--	9,713
Total	724,277	264,585	175,857	183,978	90,144	9,713

[1/] 21.0 inches d.b.h. and larger.

[2/] 11.0-20.9 inches d.b.h.

Table 6.--Area of commercial forest land in Whatcom County, by major forest type and stand-size class, 1957

(In acres)

Forest type	Total	Sawtimber stands		Poletimber stands	Seedling and sapling stands	Nonstocked areas
		Large[1/]	Small[2/]			
Douglas-fir	164,117	35,101	67,805	47,620	13,591	--
Hemlock—Sitka spruce	145,434	77,634	28,017	14,757	25,026	--
Lodgepole pine	3,450	--	670	2,720	60	--
Fir—spruce	113,285	74,311	27,278	7,700	3,996	--
Western white pine	670	--	--	670	--	--
Hardwoods	133,356	60	40,121	83,399	9,776	--
Nonstocked	14,560	--	--	--	--	14,560
Total	574,872	187,106	163,891	156,866	52,449	14,560

1/ 21.0 inches d.b.h. and larger.

2/ 11.0-20.9 inches d.b.h.

Table 7.--Land area in Skagit County, by cover

(In

Cover type or land class	Total unreserved and reserved
PRODUCTIVE	
	Total
1 Douglas-fir, large old-growth sawtimber (yellow fir)	13,631
2 Douglas-fir, small old-growth and large young-growth sawtimber (red fir)	30,654
3 Douglas-fir, small young-growth sawtimber	77,026
4 Douglas-fir, poletimber	52,684
5 Douglas-fir, seedlings and saplings	12,920
6 Western hemlock, large sawtimber	127,021
7 Western hemlock, small sawtimber	31,346
8 Western hemlock, poletimber	25,540
9 Western hemlock, seedlings and saplings	40,290
10 Sitka spruce, large sawtimber	30
11 Engelmann spruce, large sawtimber	1,347
12 Engelmann spruce, small sawtimber	2,693
13 Western redcedar, large sawtimber	15,036
14 Western redcedar, small sawtimber	1,283
15 Western redcedar, poletimber	910
16 White fir, large sawtimber[1/]	703
17 True fir--mountain hemlock, large sawtimber	93,963
18 True fir—mountain hemlock, small sawtimber	17,752
19 True fir—mountain hemlock, poletimber	6,513
20 True fir—mountain hemlock, seedlings and saplings	18,844
21 Ponderosa pine, seedlings and saplings	40
22 Western white pine, poletimber	1,347
23 Lodgepole pine, poletimber	2,764
24 Lodgepole pine, seedlings and saplings	80
25 Hardwoods, large sawtimber	1,410
26 Hardwoods, small sawtimber	49,437
27 Hardwoods, poletimber	94,510
28 Hardwoods, seedlings and saplings	18,120
29 Nonstocked area, recently clear cut	)
30 Nonstocked area, old clear cut	[2/] 9,733)
31 Nonstocked area, deforested by fire	)
32 Total	747,627
NONCOMMERCIAL	
33 Subalpine	36,883
34 Noncommercial, rocky	63,676
35 Total	100,559
NONFOREST	
36 Vegetative land (cultivated, grass, or brush)	154,549
37 Nonvegetative land (including barrens, tideflats, and cities)	96,915
38 Unmeandered water	8,500
39 Total	259,964
ALL	
Forest land:	
40 Commercial	724,277
41 Noncommercial (productive-reserved and unproductive)	123,909
42 Total forest land	848,186
43 Nonforest land	259,964
44 Total, all land	1,108,150

[1/] See list of tree species, page 47.

[2/] No breakdown on nonstocked national-forest land.

type, ownership class, and land-use class, 1957

acres)

Total	Unreserved: Private	State	County	Municipal	Federally owned or administered: Indian	Bureau of Land Mgt.	National forest	Reserved: Total	State	Federal (national forest)	
F O R E S T L A N D											
								Noncommercial (productive-reserved)			
				Commercial							
12,971	2,990	1,060	10	130	40	50	8,691	660	250	410	1
29,274	10,850	3,040	50	230	280	730	14,094	1,380	460	920	2
76,896	36,180	12,700	250	1,380	2,020	960	23,406	130	130	--	3
52,654	28,830	16,420	1,150	500	700	130	4,924	30	30	--	4
12,920	6,690	3,420	40	60	190	20	2,500	--	--	--	5
120,731	35,880	9,680	--	--	20	790	74,361	6,290	--	6,290	6
31,156	17,320	4,610	30	--	140	490	8,566	190	--	190	7
25,540	12,570	12,170	10	--	--	40	750	--	--	--	8
40,290	28,390	6,870	140	--	--	10	4,880	--	--	--	9
30	30	--	--	--	--	--	--	--	--	--	10
1,347	--	--	--	--	--	--	1,347	--	--	--	11
2,693	--	--	--	--	--	--	2,693	--	--	--	12
14,866	2,110	580	--	--	--	--	12,176	170	--	170	13
1,283	540	40	--	30	--	--	673	--	--	--	14
910	780	120	--	--	10	--	--	--	--	--	15
703	30	--	--	--	--	--	673	--	--	--	16
83,253	13,710	3,080	--	--	--	230	66,233	10,710	--	10,710	17
14,492	800	680	--	--	--	--	13,012	3,260	--	3,260	18
6,323	520	430	--	--	--	--	5,373	190	--	190	19
18,694	14,850	3,170	--	--	--	--	674	150	--	150	20
40	--	40	--	--	--	--	--	--	--	--	21
1,347	--	--	--	--	--	--	1,347	--	--	--	22
2,764	50	20	--	--	--	--	2,694	--	--	--	23
80	30	50	--	--	--	--	--	--	--	--	24
1,410	1,210	180	20	--	--	--	--	--	--	--	25
49,337	39,250	6,800	360	80	1,430	50	1,367	100	100	--	26
94,440	66,650	24,540	1,270	510	1,200	90	180	70	--	70	27
18,120	15,610	2,140	210	50	50	40	20	--	--	--	28
)	3,310	3,380	--	--	40	10	)	--	--	--	29
2/ 9,713)	180	580	--	--	--	--	2/ 1,523)	--	--	--	30
)	190	500	--	--	--	--	)	20	--	20	31
724,277	339,550	116,300	3,540	2,970	6,120	3,640	252,157	23,350	970	22,380	32
U N P R O D U C T I V E F O R E S T L A N D											
23,823	110	250	--	--	--	--	23,463	13,060	--	13,060	33
55,706	3,090	1,170	--	140	20	30	51,256	7,970	30	7,940	34
79,529	3,200	1,420	--	140	20	30	74,719	21,030	30	21,000	35
L A N D											
146,389	117,610	1,980	380	50	720	30	25,619	8,160	30	8,130	36
69,045	9,970	1,140	200	100	100	--	57,535	27,870	50	27,820	37
7,980	5,050	710	60	80	50	10	2,020	520	--	520	38
223,414	132,630	3,830	640	230	870	40	85,174	36,550	80	36,470	39
L A N D											
724,277	339,550	116,300	3,540	2,970	6,120	3,640	252,157	--	--	--	40
79,529	3,200	1,420	--	140	20	30	74,719	44,380	1,000	43,380	41
803,806	342,750	117,720	3,540	3,110	6,140	3,670	326,876	44,380	1,000	43,380	42
223,414	132,630	3,830	640	230	870	40	85,174	36,550	80	36,470	43
1,027,220	475,380	121,550	4,180	3,340	7,010	3,710	412,050	80,930	1,080	79,850	44

Table 8.--Land area in Whatcom County, by cover

(In

	Cover type or land class	Total unreserved and reserved
	PRODUCTIVE	
		Total
1	Douglas-fir, large old-growth sawtimber (yellow fir)	22,705
2	Douglas-fir, small old-growth and large young-growth sawtimber (red fir)	31,327
3	Douglas-fir, small young-growth sawtimber	72,903
4	Douglas-fir, poletimber	51,190
5	Douglas-fir, seedlings and saplings	21,101
6	Western hemlock, large sawtimber	85,422
7	Western hemlock, small sawtimber	30,159
8	Western hemlock, poletimber	18,137
9	Western hemlock, seedlings and saplings	27,706
10	Sitka spruce, large sawtimber	3,520
11	Sitka spruce, small sawtimber	3,349
12	Sitka spruce, poletimber	40
13	Engelmann spruce, large sawtimber	670
14	Engelmann spruce, small sawtimber	670
15	Western redcedar, large sawtimber	12,271
16	Western redcedar, small sawtimber	5,141
17	Western redcedar, poletimber	610
18	White fir, small sawtimber[1/]	1,339
19	True fir—mountain hemlock, large sawtimber	97,031
20	True fir—mountain hemlock, small sawtimber	45,139
21	True fir—mountain hemlock, poletimber	12,150
22	True fir—mountain hemlock, seedlings and saplings	7,386
23	Western white pine, poletimber	670
24	Lodgepole pine, small sawtimber	670
25	Lodgepole pine, poletimber	2,720
26	Lodgepole pine, seedlings and saplings	60
27	Hardwoods, large sawtimber	120
28	Hardwoods, small sawtimber	40,661
29	Hardwoods, poletimber	83,529
30	Hardwoods, seedlings and saplings	9,796
31	Nonstocked area, recently clear cut	)
32	Nonstocked area, old clear cut	[2/]15,250)
33	Nonstocked area, deforested by fire	)
34	Total	703,442
	NONCOMMERCIAL	
35	Subalpine	74,728
36	Noncommercial, rocky	163,191
37	Total	237,919
	NONFOREST	
38	Vegetative land (cultivated, grass, or brush)	213,527
39	Nonvegetative land (including barrens, tideflats, and cities)	201,120
40	Unmeandered water	14,172
41	Total	428,819
	ALL	
	Forest land:	
42	Commercial	574,872
43	Noncommercial (productive-reserved and unproductive)	366,489
44	Total forest land	941,361
45	Nonforest land	428,819
46	Total, all land	1,370,180

[1/] See list of tree species, page 47.

[2/] No breakdown on nonstocked national forest land.

type, ownership class, and land-use class, 1957

acres)

Unreserved								Reserved			
					Federally owned or administered						
Total	Private	State	County	Municipal	Indian	Bureau of Land Mgt.	National forest	Total	State	Federal (national forest)	
FOREST LAND											
Commercial								Noncommercial (productive-reserved)			
16,895	1,520	1,070	--	--	--	30	14,275	5,810	20	5,790	1
15,067	6,550	3,150	--	50	40	230	5,047	16,260	160	16,100	2
66,093	26,250	9,610	--	340	420	700	28,773	6,810	510	6,300	3
47,400	26,160	12,920	10	100	30	920	7,260	3,790	130	3,660	4
13,591	6,580	2,270	40	40	--	10	4,651	7,510	--	7,510	5
69,942	14,240	8,840	40	--	--	370	46,452	15,480	--	15,480	6
21,259	5,350	3,380	10	--	--	80	12,439	8,900	--	8,900	7
14,327	5,650	3,670	70	--	--	80	4,857	3,810	--	3,810	8
25,026	17,870	5,540	200	--	--	190	1,226	2,680	--	2,680	9
1,400	60	--	--	--	--	--	1,340	2,120	--	2,120	10
3,349	--	--	--	--	--	--	3,349	--	--	--	11
40	--	--	--	--	40	--	--	--	--	--	12
670	--	--	--	--	--	--	670	--	--	--	13
670	--	--	--	--	--	--	670	--	--	--	14
9,431	800	560	--	--	--	--	8,071	2,840	--	2,840	15
5,121	1,670	10	--	--	410	--	3,031	20	20	--	16
610	590	20	--	--	--	--	--	--	--	--	17
1,339	--	--	--	--	--	--	1,339	--	--	--	18
73,641	8,170	1,520	--	--	--	120	63,831	23,390	--	23,390	19
25,269	1,430	150	--	--	--	60	23,629	19,870	--	19,870	20
7,700	270	10	--	--	--	--	7,420	4,450	--	4,450	21
3,996	2,480	960	--	--	--	--	556	3,390	--	3,390	22
670	--	--	--	--	--	--	670	--	--	--	23
670	--	--	--	--	--	--	670	--	--	--	24
2,720	30	10	--	--	--	--	2,680	--	--	--	25
60	60	--	--	--	--	--	--	--	--	--	26
60	40	--	--	--	20	--	--	60	--	60	27
40,121	27,890	4,010	210	130	4,810	110	2,961	540	290	250	28
83,399	69,140	8,950	360	610	2,750	920	669	130	110	20	29
9,776	6,810	810	120	120	140	110	1,666	20	20	--	30
)	5,490	1,230	110	--	--	40	)	110	10	100	31
[2]/14,560)	630	140	--	--	--	--	[2]/3,100)	--	--	--	32
)	3,150	560	--	--	--	110	)	580	--	580	33
574,872	238,880	69,390	1,170	1,390	8,660	4,080	251,302	128,570	1,270	127,300	34
UNPRODUCTIVE FOREST LAND											
23,398	740	280	--	--	--	30	22,348	51,330	--	51,330	35
63,191	430	60	--	60	--	40	62,601	100,000	--	100,000	36
86,589	1,170	340	--	60	--	70	84,949	151,330	--	151,330	37
LAND											
179,267	153,390	1,160	170	20	3,610	80	20,837	34,260	60	34,200	38
90,540	10,420	420	500	100	30	--	79,070	110,580	--	110,580	39
10,422	2,300	150	30	--	240	50	7,652	3,750	--	3,750	40
280,229	166,110	1,730	700	120	3,880	130	107,559	148,590	60	148,530	41
LAND											
574,872	238,880	69,390	1,170	1,390	8,660	4,080	251,302	--	--	--	42
86,589	1,170	340	--	60	--	70	84,949	279,900	1,270	278,630	43
661,461	240,050	69,730	1,170	1,450	8,660	4,150	336,251	279,900	1,270	278,630	44
280,229	166,110	1,730	700	120	3,880	130	107,559	148,590	60	148,530	45
941,690	406,160	71,460	1,870	1,570	12,540	4,280	443,810	428,490	1,330	427,160	46

Table 9.--Area of commercial forest land in Skagit County, by forest-condition and ownership classes, 1957

(In acres)

Forest-condition class	Total	Private	State	County	Municipal	Federally owned or administered		
						Indian	Bureau of Land Mgt.	National forest
Softwoods:								
Large sawtimber:								
Uncut	257,325	64,200	17,390	60	360	340	1,530	173,445
Residual	5,850	1,400	50	--	--	--	270	4,130
Total	263,175	65,600	17,440	60	360	340	1,800	177 575
Small sawtimber:								
Uncut	114,990	46,190	17,710	280	1,210	1,850	1,420	46,330
Residual	11,530	8,650	320	--	200	310	30	2,020
Total	126,520	54,840	18,030	280	1,410	2,160	1,450	48,350
Poletimber	89,538	42,750	29,160	1,160	500	710	170	15,088
Seedlings and saplings	72,024	49,960	13,550	180	60	190	30	8,054
Hardwoods	163,307	122,720	33,660	1,860	640	2,680	180	1,567
Nonstocked	9,713	3,680	4,460	--	--	40	10	1,523
Total	724,277	339,550	116,300	3,540	2,970	6,120	3,640	252,157

Table 10.--Area of commercial forest land in Whatcom County, by forest-condition and ownership classes, 1957

(In acres)

Forest-condition class	Total	Private	State	County	Municipal	Federally owned or administered		
						Indian	Bureau of Land Mgt.	National forest
Softwoods:								
Large sawtimber:								
Uncut	182,676	29,790	14,690	40	--	20	740	137,396
Residual	4,370	1,550	450	--	50	20	10	2,290
Total	187,046	31,340	15,140	40	50	40	750	139,686
Small sawtimber:								
Uncut	111,996	27,130	12,560	10	330	240	810	70,916
Residual	11,774	7,570	590	--	10	590	30	2,984
Total	123,770	34,700	13,150	10	340	830	840	73,900
Poletimber	73,467	32,700	16,630	80	100	70	1,000	22,887
Seedlings and saplings	42,673	26,990	8,770	240	40	--	200	6,433
Hardwoods	133,356	103,880	13,770	690	860	7,720	1,140	5,296
Nonstocked	14,560	9,270	1,930	110	--	--	150	3,100
Total	574,872	238,880	69,390	1,170	1,390	8,660	4,080	251,302

Table 11.--Area of young-growth timber stands on commercial forest land in Skagit County, by stand-size class, species group, and stocking class, 1957

(In acres)

Stand-size class and species group	Total	Well stocked	Medium stocked	Poorly stocked
Large young-growth sawtimber:				
Softwoods	29,274	27,877	724	673
Hardwoods	--	--	--	--
Total	29,274	27,877	724	673
Small young-growth sawtimber:				
Softwoods	126,520	125,253	600	667
Hardwoods	49,337	48,287	1,050	--
Total	175,857	173,540	1,650	667
Poletimber:				
Softwoods	89,538	82,189	4,217	3,132
Hardwoods	94,440	91,370	2,950	120
Total	183,978	173,559	7,167	3,252
Seedlings & saplings:				
Softwoods	72,024	53,784	14,220	4,020
Hardwoods	18,120	14,930	2,780	410
Total	90,144	68,714	17,000	4,430
All classes:				
Softwoods	317,356	289,103	19,761	8,492
Hardwoods	161,897	154,587	6,780	530
Total	479,253	443,690	26,541	9,022

Table 12.--Area of young-growth timber stands on commercial forest land in Whatcom County, by stand-size class, species group, and stocking class, 1957

(In acres)

Stand-size class and species group	Total	Well stocked	Medium stocked	Poorly stocked
Large young-growth sawtimber:				
Softwoods	15,067	13,727	1,340	--
Hardwoods	--	--	--	--
Total	15,067	13,727	1,340	--
Small young-growth sawtimber:				
Softwoods	123,770	111,360	11,185	1,225
Hardwoods	40,121	38,561	935	625
Total	163,891	149,921	12,120	1,850
Poletimber:				
Softwoods	73,467	59,814	6,181	7,472
Hardwoods	83,399	81,660	1,050	689
Total	156,866	141,474	7,231	8,161
Seedlings & saplings:				
Softwoods	42,673	27,196	11,327	4,150
Hardwoods	9,776	7,576	2,020	180
Total	52,449	34,772	13,347	4,330
All classes:				
Softwoods	254,977	212,097	30,033	12,847
Hardwoods	133,296	127,797	4,005	1,494
Total	388,273	339,894	34,038	14,341

Table 13.--Net volume of live sawtimber and growing stock on commercial forest land in Skagit County, by ownership class, 1957

Ownership class	Live sawtimber volume		Growing stock volume
	Log scale, Scribner rule	International 1/4-inch rule	
	Million bd. ft.	Million bd. ft.	Million cu. ft.
Private	4,139	4,520	1,056
State	1,145	1,253	316
County	15	17	6
Municipal	33	36	9
Federally owned or administered:			
Indian	55	61	17
Bur. of Land Mgt.	94	103	21
National forest	9,601	10,360	2,028
Total Federal	9,750	10,524	2,066
All ownerships	15,082	16,350	3,453

Table 14.--Net volume of live sawtimber and growing stock on commercial forest land in Whatcom County, by ownership class, 1957

Ownership class	Live sawtimber volume		Growing stock volume
	Log scale, Scribner rule	International 1/4-inch rule	
	Million bd. ft.	Million bd. ft.	Million cu. ft.
Private	2,433	2,667	734
State	946	1,033	260
County	6	7	2
Municipal	10	11	4
Federally owned or administered:			
Indian	79	88	27
Bur. of Land Mgt.	50	54	14
National forest	7,699	8,310	1,662
Total Federal	7,828	8,452	1,703
All ownerships	11,223	12,170	2,703

Table 15.--Net volume of live sawtimber and growing stock on commercial forest land in Skagit County, by stand-size class, 1957

Stand-size class	Live sawtimber volume		Growing stock volume
	Log scale, Scribner rule	International 1/4-inch rule	
	Million bd. ft.	Million bd. ft.	Million cu. ft.
Sawtimber stands	14,646	15,862	3,171
Poletimber stands	374	420	261
Seedling and sapling stands	60	66	19
Nonstocked areas	2	2	2
Total	15,082	16,350	3,453

Table 16.--Net volume of live sawtimber and growing stock on commercial forest land in Whatcom County, by stand-size class, 1957

Stand-size class	Live sawtimber volume		Growing stock volume
	Log scale, Scribner rule	International 1/4-inch rule	
	Million bd. ft.	Million bd. ft.	Million cu. ft.
Sawtimber stands	10,820	11,719	2,426
Poletimber stands	370	415	265
Seedling and sapling stands	31	34	10
Nonstocked areas	2	2	2
Total	11,223	12,170	2,703

Table 17.--Net volume of live sawtimber and growing stock on commercial forest land in Skagit County, by species, 1957

Species	Live sawtimber volume		Growing stock volume
	Log scale, Scribner rule	International 1/4-inch rule	
	Million bd. ft.	Million bd. ft.	Million cu. ft.
Softwoods:			
Douglas-fir	2,122	2,329	529
Western hemlock	4,942	5,338	930
Mountain hemlock	776	838	192
Sitka spruce	57	60	12
Engelmann spruce	81	89	17
Western redcedar	1,006	1,066	272
Alaska-cedar	42	44	14
Western white pine	27	29	4
Whitebark pine	(1/)	(1/)	1
Lodgepole pine	1	1	5
Pacific silver fir	5,289	5,712	1,178
White fir	50	54	12
Subalpine fir	46	50	13
Total	14,439	15,610	3,179
Hardwoods:			
Red alder	434	499	207
Bigleaf maple	154	177	47
Black cottonwood	54	63	13
Western paper birch	1	1	5
Pacific madrone	--	--	2
Total	643	740	274
All species	15,082	16,350	3,453

1/ Less than 0.5 million.

Table 18.--Net volume of live sawtimber and growing stock on commercial forest land in Whatcom County, by species, 1957

Species	Live sawtimber volume		Growing stock volume
	Log scale, Scribner rule	International 1/4-inch rule	
	Million bd. ft.	Million bd. ft.	Million cu. ft.
Softwoods:			
Douglas-fir	1,917	2,102	473
Western hemlock	3,823	4,129	750
Mountain hemlock	570	615	157
Sitka spruce	163	173	42
Engelmann spruce	8	8	1
Western redcedar	694	736	205
Alaska-cedar	115	122	42
Western white pine	40	43	14
Lodgepole pine	4	4	5
Pacific silver fir	3,214	3,471	703
White fir	24	26	6
Subalpine fir	114	124	31
Total	10,686	11,553	2,429
Hardwoods:			
Red alder	297	342	169
Bigleaf maple	194	223	63
Aspen	--	--	(1/)
Black cottonwood	30	34	8
Western paper birch	16	18	34
Total	537	617	274
All species	11,223	12,170	2,703

1/ Less than 0.5 million.

Table 19.--Net volume of live sawtimber on commercial forest land in Skagit County, by diameter class and species group, 1957

(In million board feet)

Diameter class (inches d.b.h.) and log rule	Total	Douglas-fir	Western hemlock	Western redcedar	Pacific silver fir	Other soft-woods	Hard-woods
11.0-20.9:							
Scribner rule	3,446	757	830	132	951	240	536
International 1/4-inch rule	3,818	878	897	139	1,027	260	617
21.0-30.9:							
Scribner rule	4,016	590	1,168	168	1,718	289	83
International 1/4-inch rule	4,340	637	1,262	178	1,855	312	96
31.0-40.9:							
Scribner rule	3,860	358	1,175	208	1,868	227	24
International 1/4-inch rule	4,159	380	1,269	221	2,017	245	27
41.0 and larger:							
Scribner rule	3,760	417	1,769	498	752	324	--
International 1/4-inch rule	4,033	434	1,910	528	813	348	--
All diameter classes:							
Scribner rule	15,082	2,122	4,942	1,006	5,289	1,080	643
International 1/4-inch rule	16,350	2,329	5,338	1,066	5,712	1,165	740

Table 20.--Net volume of live sawtimber on commercial forest land in Whatcom County, by diameter class and species group, 1957

(In million board feet)

Diameter class (inches d.b.h.) and log rule	Total	Douglas-fir	Western hemlock	Western redcedar	Pacific silver fir	Other soft-woods	Hard-woods
11.0-20.9:							
Scribner rule	3,075	664	801	132	731	293	454
International 1/4-inch rule	3,407	773	866	141	790	314	523
21.0-30.9:							
Scribner rule	3,252	531	997	133	1,218	308	65
International 1/4-inch rule	3,512	574	1,076	141	1,315	331	75
31.0-40.9:							
Scribner rule	2,550	214	895	141	1,008	281	11
International 1/4-inch rule	2,745	227	966	149	1,089	302	12
41.0 and larger:							
Scribner rule	2,346	508	1,130	288	257	156	7
International 1/4-inch rule	2,506	528	1,221	305	277	168	7
All diameter classes:							
Scribner rule	11,223	1,917	3,823	694	3,214	1,038	537
International 1/4-inch rule	12,170	2,102	4,129	736	3,471	1,115	617

Table 21.--Net volume of all timber on commercial forest land in Skagit County, by class of material and species group, 1957

(In million cubic feet)

Class of material	Total	Softwoods	Hardwoods
Growing stock:			
Sawtimber trees:			
Saw-log portion	2,817	2,651	166
Upper-stem portion	212	199	13
Total	3,029	2,850	179
Poletimber trees	424	329	95
Total growing stock	3,453	3,179	274
Other material:			
Sound cull trees	28	4	24
Rotten cull trees	7	5	2
Salvable dead trees	63	62	1
Total other material	98	71	27
All timber	3,551	3,250	301

Table 22.--Net volume of all timber on commercial forest land in Whatcom County, by class of material and species group, 1957

(In million cubic feet)

Class of material	Total	Softwoods	Hardwoods
Growing stock:			
Sawtimber trees:			
Saw-log portion	2,114	2,012	102
Upper-stem portion	159	151	8
Total	2,273	2,163	110
Poletimber trees	430	266	164
Total growing stock	2,703	2,429	274
Other material:			
Sound cull trees	15	4	11
Rotten cull trees	9	8	1
Salvable dead trees	66	64	2
Total other material	90	76	14
All timber	2,793	2,505	288

Table 23.--Average annual cut of live sawtimber and growing stock on commercial forest land in Skagit County, by species group, 1953-57

Species group	Live sawtimber						Growing stock		
	Scribner rule, log scale			International ¼-inch rule					
	Annual cut[1/]	Timber products	Logging residue	Annual cut[1/]	Timber products	Logging residue	Annual cut[1/]	Timber products	Logging residue
	Thousand board feet			Thousand board feet			Thousand cubic feet		
Softwoods	134,187	122,255	11,932	144,251	131,424	12,827	22,426	20,376	2,050
Hardwoods	2,732	2,489	243	2,937	2,676	261	457	415	42
Total	136,919	124,744	12,175	147,188	134,100	13,088	22,883	20,791	2,092

1/ Annual cut is the sum of timber products and logging residue.

Table 24.--Average annual cut of live sawtimber and growing stock on commercial forest land in Whatcom County, by species group, 1953-57

Species group	Live sawtimber						Growing stock		
	Scribner rule, log scale			International ¼-inch rule					
	Annual cut[1/]	Timber products	Logging residue	Annual cut[1/]	Timber products	Logging residue	Annual cut[1/]	Timber products	Logging residue
	Thousand board feet			Thousand board feet			Thousand cubic feet		
Softwoods	155,417	141,597	13,820	167,073	152,217	14,856	25,974	23,600	2,374
Hardwoods	3,020	2,752	268	3,253	2,958	295	505	459	46
Total	158,437	144,349	14,088	170,326	155,175	15,151	26,479	24,059	2,420

1/ Annual cut is the sum of timber products and logging residue.

FOREST SURVEY PROCEDURE

Procedures used in the second reinventory of Skagit and Whatcom Counties were materially different from those used in the initial inventory and first reinventory. This change in procedures accounts for some significant differences in the forest-area and timber-volume statistics obtained.

Initial Inventory

The initial inventory of the counties' forests was conducted in 1931 and 1932 by what is known as the "compilation method." In this method, existing information on forest types, timber volumes, areas logged, and other inventory data were collected from private timber owners and various public agencies. These data were checked in the field for reliability and were adjusted to the specifications and standards of Forest Survey. Forest-type and timber-volume data for areas not covered by reliable existing information were obtained through field reconnaissance. Timber-volume estimates for immature stands were determined from normal yield tables adjusted for site, age, and density of stand.

All land in the counties was classified as either forest or nonforest. Forest land was further classified as commercial or noncommercial; the commercial was still further classified by forest type, stand-size or condition class, and--in case of young-growth stands--by stocking and age classes. All such types and classes were mapped in place on a 1-inch-to-the-mile base map of each forested township. Next, these township type maps were superimposed over current ownership-status plats and dot counted to obtain forest-type area statistics by ownership class. Type delineations on the township maps were then transferred to a base map of each county to form a county forest type map. The commercial forest land was also classified as to site quality, or forest productive capacity.

In-place, timber-volume estimates were based on (1) existing cruises collected and adjusted to the Forest Survey standard, (2) field samples, and (3) ocular appraisals. Cruises made by commercial cruisers were obtained for most of the privately owned timber, and Forest Service cruises were available for a large part of the national-forest lands. Separate volume estimates were computed for each of the commercial tree species and for each ownership class. Methods used in this initial inventory did not permit a statistical computation of accuracy of the estimate.

First Reinventory

The first reinventory, in 1941, included a complete revision of the forest type map of each county. For this revision, records of cutting and other drain since the original inventory were obtained from various sources and verified in the field by ground reconnaissance. Areas on which the type had changed due to cutting, restocking of cut-over or burned-over land, and ingrowth of immature stands were re-mapped on the ground, and the ownership status was brought up to date. Then, on the basis of the new ownership data and the revised forest type map, area statistics by forest types were recomputed.

Timber-volume estimates for mature sawtimber stands were based on cruise data collected during the original survey and adjusted for cutting and other drain that had occurred during the interval between inventories. Volume estimates for immature stands were based on yield tables adjusted for site, age, and density of stand.

Second Reinventory

In the reinventory in 1957, the forest type maps of both counties were completely revised. This revision was accomplished through interpretation, classification, and field mapping on aerial photos that covered all the land area in the two counties. In mapping on aerial photos, types whose classification was difficult were examined more closely in the field. Likewise, species composition of mixed stands was checked on the ground. The use of aerial photos in mapping resulted in type delineations of much greater accuracy and detail than was possible through the ground reconnaissance employed in the initial inventory. In the preparation of a revised type map, the delineations on the aerial photos were transferred to a 2-inch county base map through use of a reflecting projector.

Volume estimates for live sawtimber, growing stock, and salvable dead material were derived through a sampling procedure in which stands were measured on sample plots. A sample plot consisted of a cluster of 3 fifth-acre circular subplots spaced at 6-chain intervals. Intensity of sampling was designed to produce an estimate of total volume to a specified sampling accuracy set by Forest Survey.

Similar methods were used for developing type area and volume estimates on the Sauk and Suiattle Working Circles of the Mount

Baker National Forest and the area outside the national forest. A different procedure was used for the remainder of the national forest.

For those areas outside the national forest and for the Sauk and Suiattle Working Circles, type areas were determined by a dot count on the forest type map. The average per-acre volumes for sawtimber, poletimber, and seedling and sapling stands were obtained through a sampling procedure in which stands were sampled with a systematic grid of plots evenly distributed over each county. This was slightly modified in the Sauk and Suiattle Working Circles, where the plots were selected randomly. Volume estimates were calculated by applying average per-acre volumes to the appropriate forest type areas.

Land classification for the Baker River, Skagit, and Glacier Working Circles of the Mount Baker National Forest was based on a systematic grid of plots. Each subplot was first classified as commercial forest, noncommercial forest, or nonforest. The ratio of subplots in each class to the total number of subplots was applied to the total land area to determine the acreage of each classification. Subplots falling on commercial forest land were also classified by forest type and stand-size class as indicated by the plot tally. The percentage of subplots falling in each type was applied to the total area of commercial forest land in the working circle to determine the acreage of land in that type.

Volumes were determined in the following manner: For each working circle, an average volume per acre was determined by species for all subplots falling on commercial forest land. These volumes expanded by the total acreage of commercial forest land in each working circle, provided total volume by species for each working circle inventoried.

ACCURACY OF 1957 REINVENTORY DATA

Forest Area

With the exception of three national-forest working circles, acreages of forest type, stand-size class, and condition class were obtained from forest type maps of the two counties. Thus no error due to sampling was involved in most of the two-county area. Errors due to techniques or judgment in the field were possible but difficult to evaluate. Throughout all phases of the work, however, close supervision and frequent checks assured a high level of accuracy and uniformity of standards.

The Baker River, Glacier and Skagit Working Circles of the Mount Baker National Forest were sampled for area. The chances are 19 out of 20 that the actual total area of commercial forest land in the Skagit County parts of the Baker River and Skagit Working Circles is within plus or minus 12.2 percent of the estimated total of 176,000 acres, and that the noncommercial area is within plus or minus 31.4 percent of the estimated 66,000 acres. On the same basis, the area of commercial forest land in the Whatcom County parts of the Baker River, Skagit, and Glacier Working Circles is within plus or minus 6.9 percent of the estimated total of 251,000 acres, and the noncommercial area is within plus or minus 22.4 percent of the estimated total of 85,000 acres.

Timber Volume

The chances are 19 out of 20 that the total board-foot volume of live sawtimber, if measured by a 100-percent cruise, would be within plus or minus 17.3 percent of the estimated total of 15,082 million board feet (log scale, Scribner rule) for Skagit County and within plus or minus 12.0 percent of the estimated total of 11,233 million board feet for Whatcom County. On the same basis, cubic-foot volume of growing stock from a 100-percent cruise would be within a range of plus or minus 13.8 percent of the estimated 3,453 million cubic feet for Skagit County and 9.8 percent of the estimated 2,703 million cubic feet for Whatcom County.

DIFFERENCES IN RESULTS OF INVENTORIES

Some of the differences between forest-type and timber-volume statistics resulting from the initial inventory and first reinventory and those resulting from the second reinventory are due to physical change--such as cutting of stands, restocking of deforested areas, and ingrowth of stands into the next larger size class. Other differences are due to variations in the procedures used to interpret and classify forest conditions, and to variations in standards of utilization. Differences such as these preclude direct comparison of some of the statistics; comparison of other statistics is meaningful only after they have been adjusted to common standards.

Forest Area

Standards of merchantability changed too extensively in the 1941-57 period to make area comparisons meaningful. The 1957

reinventory included a considerable acreage of forest land--mostly small hardwood woodlots--that was previously classed as agricultural land. Despite this, the 1957 reinventory showed a marked decrease in forest land area in both counties. Most of this change is a result of reclassification of barren areas at timberline, formerly classified as noncommercial forest land, to nonforest land. This also partially explains the decrease in noncommercial unproductive forest land area.

Table 25.--Comparison of forest area statistics for Skagit and Whatcom Counties, initial inventory and reinventories

(Thousand acres)

Forest area	Both counties			Skagit			Whatcom		
	1932	1941	1957	1932	1941	1957	1932	1941	1957
Sawtimber[1/]	841	843	916	445	431	463	396	412	453
Poletimber[1/]; seedlings and saplings	303	368	509	149	204	274	154	164	235
Nonstocked	211	138	25	113	76	10	98	62	15
Noncommercial unproductive	541	546	339	176	172	101	365	374	238
Total	1,896	1,895	1,789	883	883	848	1,013	1,012	941

[1/] 1932-1941 data adjusted to present standards.

As a result of changes in merchantability standards, other areas have been reclassified from noncommercial to commercial forest land. This has increased the sawtimber area of the two counties and correspondingly decreased the area of noncommercial forest land.

In the 1932 inventory and the 1941 reinventory, all areas that had been clear cut in the 10 years preceding inventory were considered to be nonstocked. Almost all such areas are now stocked with either seedlings and saplings or poletimber, thereby increasing the acreage of those classes and greatly decreasing the amount of nonstocked forest land.

Timber Volume

Some differences in volume estimates between 1932, 1941, and 1957 are due to differences in survey techniques, procedures, and methods. The effect of these differences on volume estimates cannot be adequately measured. The 1957 volume estimate has a calculated sampling error (page 37); however, no statistical evaluation of the 1932 and 1941 estimates can be made.

Changes in utilization standards also contributed to volume differences. Changes included the lowering of the minimum d.b.h. merchantable top diameter of sawtimber trees and reducing the minimum requirement of net sound volume in a sawtimber tree. In 1957, improved volume tables were used that gave a materially greater volume for a tree of a given size than did the tables used in the 1932 and 1941 inventories. Reclassification of forest land from noncommercial unproductive to commercial has further increased inventory volumes.

Because of the influence of these factors, the three inventory estimates are not strictly comparable and do not necessarily reflect a trend or actual changes in the counties' total volume of sawtimber.

Table 26.--Comparison of timber volume statistics for Skagit and Whatcom Counties, initial inventory and reinventories

(Million board feet, log scale, Scribner rule)

Species	Both counties			Skagit			Whatcom		
	1932 1/ 2/	1941 1/ 2/	1957	1932 1/ 2/	1941 1/ 2/	1957	1932 1/ 2/	1941 1/ 2/	1957
Western hemlock	8,310	7,579	8,765	5,701	5,074	4,942	2,609	2,505	3,823
Pacific silver fir	6,427	6,008	8,503	3,114	3,020	5,289	3,313	2,988	3,214
Douglas-fir	5,492	4,652	4,039	3,615	2,813	2,122	1,877	1,839	1,917
Other softwoods	3,850	3,274	3,818	2,505	2,000	2,086	1,345	1,274	1,732
Hardwoods	166	224	1,180	74	109	643	92	115	537
Total	24,245	21,737	26,305	15,009	13,016	15,082	9,236	8,721	11,223

1/ Volume estimates adjusted to 1957 standards.

2/ Volume estimates reduced for areas subsequently placed in productive-reserved.

DEFINITION OF TERMS

Land Area

Total Land Area

Includes dry land and unmeandered water surfaces.

Forest Land Area

Includes (a) land that is at least 10-percent stocked by trees of any size and capable of producing timber or other wood products, or of exerting an influence on the climate or on the water regime; and (b) land from which the trees described in "(a)" have been removed to less than 10-percent stocking and that has not been developed for other use. Minimum area of forest land recognized in reinventory of the counties is 10 acres.

Nonforest Land Area

Land that does not qualify as forest land. Minimum area recognized in the reinventory of the counties is 10 acres.

Forest Land Classes

Commercial Forest Land Area

Forest land that is (a) producing, or physically capable of producing, usable crops of wood, usually sawtimber, (b) economically available now or prospectively, and (c) not withdrawn from timber utilization.

Noncommercial Forest Land Area

Forest land (a) withdrawn from timber utilization through statute, ordinance, or administrative order but which otherwise qualifies as commercial forest land, or (b) incapable of yielding usable wood products (usually sawtimber) because of adverse site conditions, or so physically inaccessible as to be unavailable economically in the foreseeable future.

Types

Forest Land Types

Forest land is typed on the basis of the predominant species, as indicated by cubic volume for sawtimber and poletimber stands and number of trees for seedling and sapling stands, or on the basis of forest condition, such as nonstocked cutover or burned-over land. Where none of the indicated species comprise 50 percent or more of a given stand, the stand is classified on the basis of plurality of cubic volume or number of trees.

Commercial Forest Land

Major forest types. Local forest types are grouped into generalized types. The major forest types in Whatcom and Skagit Counties are as follows:

Douglas-fir. Forests in which 50 percent or more of the stand is Douglas-fir. Western redcedar types adjacent to Douglas-fir type are also classed as Douglas-fir major type.

Hemlock-Sitka spruce. Forests in which 50 percent or more of the stand is western hemlock, Sitka spruce, or both. Western redcedar types adjacent to hemlock-Sitka spruce type are also classed as hemlock-Sitka spruce major type.

Western white pine. Forests in which 50 percent or more of the stand is western white pine.

Lodgepole pine. Forests in which 50 percent or more of the stand is lodgepole pine.

Fir-spruce. Forests in which 50 percent or more of the stand is true fir, Engelmann spruce, or both.

Hardwoods. Forests in which 50 percent or more of the stand is red alder, black cottonwood, or other western hardwoods, singly or in combination.

Noncommercial Forest Land

Productive-reserved. Forest land withdrawn from timber utilization through statute, ordinance, or administrative order, but which otherwise qualifies as commercial forest land.

Unproductive. Forest land incapable of yielding usable wood products (usually sawtimber) because of adverse site conditions, or so physically inaccessible as to be unavailable economically in the foreseeable future.

Nonforest Land Types

Vegetative. Cultivated land, stump pasture, grass or brush on nonforest land.

Nonvegetative. Includes barrens and towns.

Unmeandered water. Includes unmeandered streams and lakes, and tideflats.

Tree Classes

Sawtimber Tree

Tree of commercial species, 11.0 inches d.b.h. and larger, that contains at least one 16-foot coniferous saw log or one 8-foot hardwood saw log to a variable top diameter never less than 8 inches inside the bark. Also, 25 percent or more of the gross board-foot volume must be free from rot or defect.

Poletimber Tree

Tree of commercial species, 5.0 to 10.9 inches d.b.h., in which 25 percent or more of the gross cubic-foot volume is free from rot and defect.

Seedling and Sapling Trees

Live trees of commercial species, less than 5.0 inches d.b.h., and of good form and vigor.

Cull Tree

Live tree of sawtimber or poletimber size that is unmerchantable for saw logs, now or prospectively, because of defect, rot, or species.

Sound cull tree. Live tree of sawtimber or poletimber size that contains 25 percent or more of sound volume but will not make at least one merchantable saw log, now or prospectively, because of roughness, poor form, or species.

Rotten cull tree. Live tree of sawtimber or poletimber size in which less than 25 percent of the total volume is sound.

Salvable Dead Tree

Standing or down dead tree that contains 25 percent or more of sound volume and at least one merchantable 16-foot coniferous or 8-foot hardwood saw log.

Stand-Size Classes

Sawtimber Stand

Stand of sawtimber trees having a minimum per-acre net volume (International 1/4-inch rule) as follows: softwoods, 5,000 board feet; hardwoods, 1,500 board feet.

Large sawtimber stand. Stand in which the majority of the volume is in trees 21.0 inches d.b.h. and larger.

Small sawtimber stand. Stand in which the majority of the volume is in trees from 11.0 to 20.9 inches d.b.h.

Uncut sawtimber stand. Uncut sawtimber stand or sawtimber stand in which less than 10 percent of its volume has been removed by cutting.

Residual sawtimber stand. Sawtimber stand in which 10 percent or more of the volume has been removed by cutting, and in which the residual per-acre volume (International 1/4-inch rule) amounts to 5,000 board feet for softwoods and 1,500 board feet for hardwoods.

Poletimber Stand

Stand failing to meet sawtimber stand specifications but at least 10-percent stocked with poletimber and larger (5.0 inches d.b.h. and larger) trees and with at least half the minimum stocking in poletimber trees.

Seedling and Sapling Stand

Stand not qualifying as either a sawtimber or poletimber stand but at least 10-percent stocked with trees of commercial species and with at least half the minimum stocking in seedling and sapling trees.

Nonstocked Area

An area less than 10-percent stocked with present or potential growing-stock trees.

Stocking

Stocking is the extent to which growing space is effectively utilized by present or potential growing-stock trees of commercial species. "Degree of stocking" is synonymous with "percent of growing space occupied" and means the ratio of actual stocking to full stocking for comparable sites and stands. Stocking may be measured in terms of number of trees, volume, basal area, cover canopy, or other criterion or combination of criteria.

Well-stocked stand. Stand that is 70 percent or more stocked with present or potential growing-stock trees.

Medium-stocked stand. Stand that is 40 to 69 percent stocked with present or potential growing-stock trees.

Poorly stocked stand. Stand that is 10 to 39 percent stocked with present or potential growing-stock trees.

Nonstocked area. An area less than 10-percent stocked with present or potential growing-stock trees.

Timber Volume

Live Sawtimber Volume

Net volume in board feet of live sawtimber trees of commercial species:

Scribner rule. The common board-foot log rule used in determining volume of sawtimber in the Pacific Northwest.

International 1/4-inch rule. The standard board-foot log rule adopted nationally by the Forest Service in the presentation of Forest Survey volume statistics.

Growing Stock

Net volume in cubic feet of live sawtimber trees and live poletimber trees from stump to a minimum 4.0-inch top (of central stem) inside bark.

All-Timber Volume

Net volume in cubic feet of live and salvable dead sawtimber trees and poletimber trees of commercial species, and cull trees of all species from stump to a minimum 4.0-inch top inside bark.

Timber Cut

Annual Cut of Live Sawtimber

The net board-foot volume of live sawtimber trees cut or killed by logging on commercial forest land during a specified year.

Timber products from live sawtimber. The volume of timber products cut from live sawtimber.

Logging residues from live sawtimber. The volume of sound wood in live sawtimber trees cut or killed by logging on commercial forest land and not converted to timber products.

Annual Cut of Growing Stock

The net cubic-foot volume of live sawtimber and poletimber trees cut or killed by logging on commercial forest land during a specified year.

Timber products from growing stock. The volume of timber products cut from growing stock.

Logging residues from growing stock. The volume of sound wood in growing stock cut or killed by logging on commercial forest land and not converted to timber products.

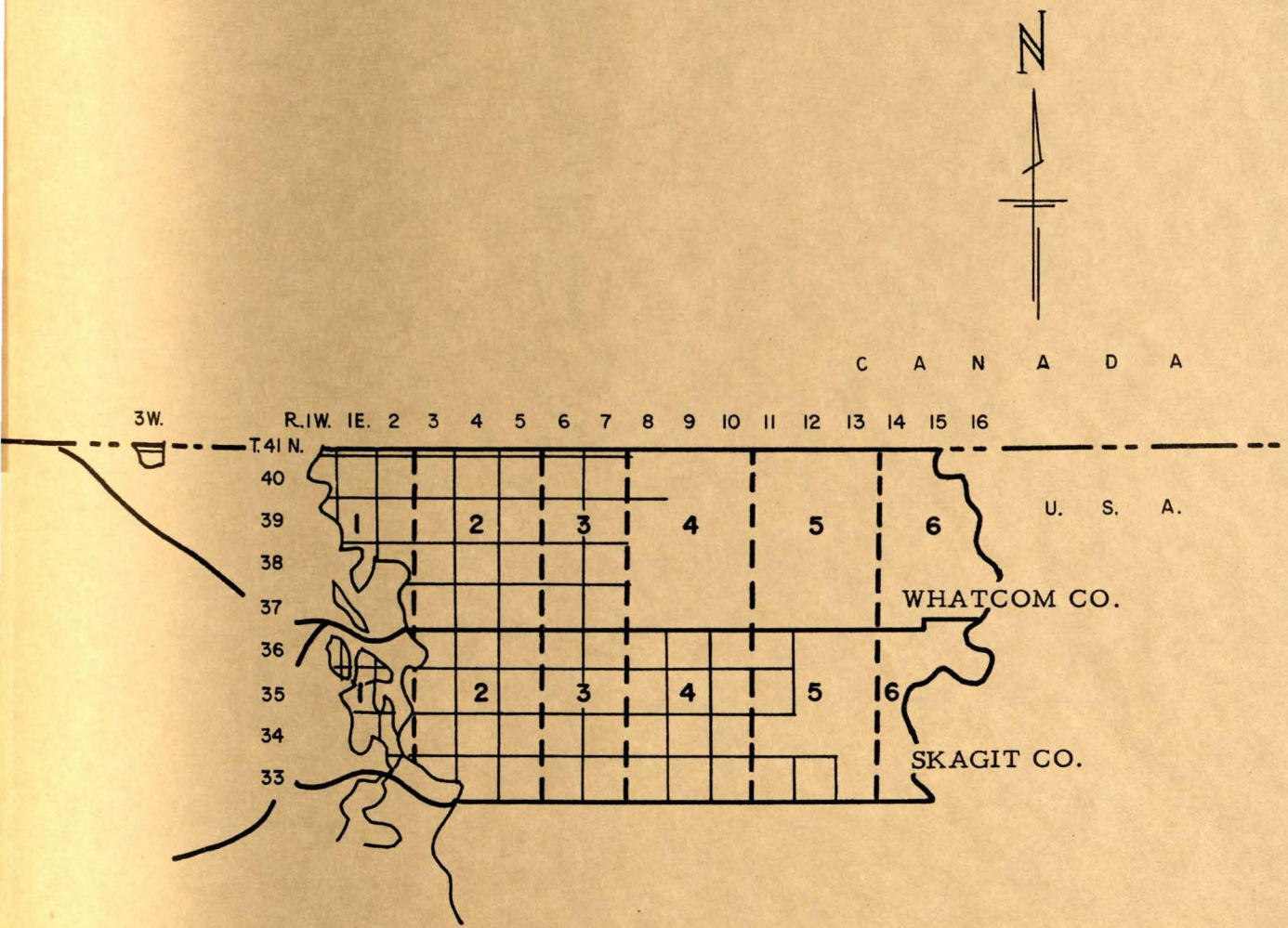
TREE SPECIES

Tree species commonly found in Skagit and Whatcom Counties include:

Softwoods:
- Douglas-fir (Pseudotsuga menziesii)
- Western hemlock (Tsuga heterophylla)
- Mountain hemlock (Tsuga mertensiana)
- Sitka spruce (Picea sitchensis)
- Engelmann spruce (Picea engelmannii)
- Western redcedar (Thuja plicata)
- Western white pine (Pinus monticola)
- Lodgepole pine (Pinus contorta)
- Pacific silver fir (Abies amabilis)
- White fir (Abies concolor or A. grandis)[1/]
- Subalpine fir (Abies lasiocarpa)
- Alaska-cedar (Chamaecyparis nootkatensis)

Hardwoods:
- Red alder (Alnus rubra)
- Bigleaf maple (Acer macrophyllum)
- Black cottonwood (Populus trichocarpa)
- Western paper birch (Betula papyrifera var. commutata)

1/ No attempt has been made to separate A. concolor (white fir) from A. grandis (grand fir). White fir, as specified in the Forest Survey in the Pacific Northwest, may be concolor, grandis, or both.



INDEX MAP of

WHATCOM and SKAGIT COUNTIES,

STATE of WASHINGTON

showing divisions of 2" = 1 mile maps

A13.66/5
133